

## CLAIMS

What is claimed is:

- 1 1. A computer-implemented graphical design tool configured to allow a user of  
2 a computer system to graphically create an operational link between a  
3 hypermedia page and a component defining a spoken dialog interaction between  
4 a person and a machine.
  
- 1 2. A computer-implemented graphical design tool as recited in claim 1, wherein  
2 the hypermedia page comprises a World Wide Web page.
  
- 1 3. A computer-implemented graphical design tool as recited in claim 2, wherein  
2 the component comprises a speech object.
  
- 1 4. A computer-implemented graphical design tool as recited in claim 1, wherein  
2 the tool is configured to allow the user to graphically map a field of a  
3 hypermedia page to a property of a speech object.
  
- 1 5. A computer-implemented graphical design tool as recited in claim 1, wherein  
2 the component comprises a speech object.
  
- 1 6. A computer-implemented graphical design tool as recited in claim 4, wherein  
2 the speech object comprises a grammar and a set of prompts associated with the

3 grammar.

1    7. A computer-implemented tool for allowing a user of a computer system to  
2    specify an operational link between a hypermedia page and a component  
3    defining a dialog interaction between a person and a machine, the tool  
4    comprising:

5                an editor configured to allow a user to specify a correspondence between  
6    an element of said component and an element of the hypermedia page; and  
7                a runtime unit configured to functionally link said component with the  
8    hypermedia page during execution of the dialog, according to the specified  
9    correspondence.

1    8. A computer-implemented tool as recited in claim 7, wherein the editor is  
2    configured to allow the user to specify the correspondence graphically.

1    9. A computer-implemented tool as recited in claim 7, wherein the hypermedia  
2    page comprises a World Wide Web page.

1    10. A computer-implemented tool as recited in claim 7, wherein the hypermedia  
2    page comprises a World Wide Web page and the component comprises a speech  
3    object.

1        11. A computer-implemented tool as recited in claim 10, wherein the editor is  
2        further configured to:

3              receive a user input specifying a field of the hypermedia page; and  
4              respond to the user input by automatically selecting an appropriate  
5        speech object from a set of selectable speech objects, based on said field.

1        12. A computer-implemented tool as recited in claim 7, wherein the component  
2        comprises a speech object.

1        13. A computer-implemented tool as recited in claim 11, wherein the speech  
2        object comprises a grammar and a set of prompts associated with the grammar.

1        14. A computer-implemented graphical design tool for allowing a user of a  
2        computer system to graphically specify an operational link between a  
3        hypermedia page and a component that defines a spoken dialog interaction  
4        between a person and a machine, the tool comprising:  
5              an editor configured to allow a user to specify a correspondence between  
6        an element of said component and an element of the hypermedia page; and  
7              a runtime unit configured to functionally link said component with the  
8        hypermedia page during execution of the spoken dialog according to the  
9        specified correspondence.

1    15. A computer-implemented tool as recited in claim 14, wherein the  
2    hypermedia page comprises a World Wide Web page.

1    16. A computer-implemented tool as recited in claim 15, wherein said element of  
2    the hypermedia page is a field of the World Wide Web page.

1    17. A computer-implemented tool as recited in claim 14, wherein the  
2    hypermedia page comprises a World Wide Web page and the component  
3    comprises a speech object.

1    18. A computer-implemented tool as recited in claim 14, wherein the component  
2    comprises a speech object.

1    19. A computer-implemented tool as recited in claim 18, wherein said element of  
2    the component is a property of the speech object.

1    20. A computer-implemented tool as recited in claim 18, wherein the speech  
2    object comprises a grammar and a set of prompts associated with the grammar.

1    21. A tool for allowing a user of a computer system to specify an operational link  
2    between a hypermedia page and a component that defines a dialog interaction  
3    between a person and a machine, the tool comprising:

4 means for allowing a user to specify a correspondence between an  
5 element of the component and an element of the hypermedia page; and  
6 means for functionally linking the component with the hypermedia page  
7 during execution of the dialog according to the specified correspondence.

1 22. A tool as recited in claim 21, wherein the hypermedia page comprises a  
2 World Wide Web page.

1 23. A tool as recited in claim 22, wherein said element of the hypermedia page is  
2 a field of the World Wide Web page.

1 24. A tool as recited in claim 21, wherein the hypermedia page comprises a  
2 World Wide Web page and the component comprises a speech object.

1 25. A tool as recited in claim 21, wherein the component comprises a speech  
2 object.

1 26. A tool as recited in claim 27, wherein said element of the component is a  
2 property of the speech object.

1 27. A tool as recited in claim 25, wherein the speech object comprises a grammar  
2 and a set of prompts associated with the grammar.

1    28. A tool as recited in claim 25, wherein the element of said hypermedia page is  
2    a field of the hypermedia page, the tool further comprising:

3                means for receiving a user input specifying the field of the hypermedia  
4    page; and

5                means for responding to the user input by automatically selecting an  
6    appropriate speech object from a set of selectable speech objects, based on said  
7    field.

1    29. A tool for authoring content for use in a voice response system, the tool  
2    comprising:

3                a first editor configured to allow a user to specify a spoken dialog between  
4    a person and a machine from a set of user-selectable components defining  
5    spoken dialog interactions; and

6                a second editor configured to allow the user to specify operational links  
7    between hypermedia pages and said components.

1    30. A tool as recited in claim 29, wherein the first editor is configured to allow  
2    the user to graphically specify the spoken dialog, and the second editor is  
3    configured to allow the user to graphically specify the operational links.

1    31. A tool as recited in claim 29, wherein the hypermedia pages comprise World

2 Wide Web pages.

1 32. A tool as recited in claim 29, wherein the set of user-selectable components  
2 comprises a set of speech objects.

1 33. A tool as recited in claim 29, wherein the hypermedia pages comprise World  
2 Wide Web pages and the set of components comprise a set of speech objects.

1 34. A tool as recited in claim 33, wherein each of the set of speech objects  
2 comprises a grammar and a set of prompts associated with the grammar.

1 35. A tool as recited in claim 29, further comprising a runtime unit configured to  
2 functionally link the set of components with the hypermedia pages during  
3 execution of the spoken dialog according to the specified links.

1 36. A tool for authoring content for use in a voice response system, the tool  
2 comprising:  
3 a first editor configured to allow a user to specify a dialog between a  
4 person and a machine from a set of user-selectable components defining dialog  
5 interactions; and  
6 a hypermedia query mechanism including  
7 a second editor configured to allow a user to specify a

8 correspondence between an element of a selected one of the components and an  
9 element of a hypermedia page, and  
10 a runtime unit configured to functionally link the selected one of  
11 the components with the hypermedia page during execution of the dialog  
12 according to the specified correspondence.

1 37. A tool as recited in claim 36, wherein the first editor is configured to allow  
2 the user to specify the dialog graphically.

1 38. A tool as recited in claim 37, wherein the second editor is configured to allow  
2 the user to specify the correspondence graphically.

1 39. A design tool for authoring content for use in a voice response system, the  
2 tool comprising:  
3 a first editor configured to provide a first graphical user interface allowing  
4 a user to graphically specify a spoken dialog between a person and a machine  
5 from a set of user-selectable components, each component for defining a spoken  
6 dialog interaction; and  
7 a query mechanism including  
8 a second editor configured to provide a second graphical user  
9 interface allowing the user to specify correspondences between properties of any  
10 of said components and fields of one or more hypermedia pages, and

11                   a runtime unit configured to functionally link said components and  
12                said hypermedia pages during execution of the spoken dialog according to the  
13                specified correspondences.

1       40. A design tool as recited in claim 39, wherein each of the set of user-selectable  
2        components is a speech object.

1       41. A design tool for authoring content for use in a voice response system, the  
2        tool comprising:

3                a first editor configured to provide a first graphical user interface allowing  
4        a user to graphically specify a spoken dialog flow between a person and a  
5        machine from a set of user-selectable speech objects, the speech objects each for  
6        defining a spoken dialog interaction between a person and a machine; and

7                a Web query mechanism including

8                a second editor configured to provide a second graphical user  
9        interface allowing the user to specify correspondences between properties of any  
10       of said speech objects and fields of one or more World Wide Web pages, and

11                a runtime unit configured to functionally link said speech objects  
12        and said World Wide Web pages during execution of a spoken dialog according  
13        to the specified correspondences.

1       42. A design tool as recited in claim 41, wherein at least one of the set of user-

2 selectable components is a speech object.

1 43. A design tool as recited in claim 43, wherein the Web query mechanism is  
2 further configured to:

3 receive a user input directed to a field of a Web page; and  
4 respond to the user input by automatically selecting an appropriate  
5 speech object from a set of selectable speech objects, based on said field.

1 44. A method of allowing a user of a computer system to create content for use  
2 in a voice response processing system, the method comprising:

3 receiving user input specifying a correspondence between an element of a  
4 hypermedia page and an element of a component that represents a spoken dialog  
5 interaction between a person and a machine; and  
6 storing data representative of the correspondence based on the user input,  
7 the data for use during execution of the spoken dialog.

1 45. A method as recited in claim 44, further comprising, during execution of the  
2 spoken dialog, automatically creating a functional link between the component  
3 and the hypermedia page according to the specified correspondence.

1 46. A method as recited in claim 44, wherein the hypermedia page comprises a  
2 World Wide Web page.

1    47. A method as recited in claim 46, wherein said element of the hypermedia  
2    page is a field of the World Wide Web page.

1    48. A method as recited in claim 44, wherein the hypermedia page comprises a  
2    World Wide Web page and the component comprises a speech object.

1    49. A method as recited in claim 44, wherein the component comprises a speech  
2    object.

1    50. A method as recited in claim 49, wherein said element of the component is a  
2    property of the speech object.

1    51. A method as recited in claim 49, wherein the speech object comprises a  
2    grammar and a set of prompts associated with the grammar.

1    52. A method of allowing a user of a computer system to specify an operational  
2    link between a hypermedia page and a component that represents a dialog  
3    interaction between a person and a machine, the method comprising:  
4                receiving user input specifying a correspondence between a property of  
5                the component and a field of the hypermedia page;  
6                during execution of the dialog, automatically creating a functional link

7     between the component and the hypermedia page according to the specified  
8     correspondence.

1     53. A method as recited in claim 52, wherein said user input comprises a drag-  
2     and-drop operation between a customizer of the component and a customizer  
3     associated with the hypermedia page.

1     54. A method as recited in claim 52, wherein the hypermedia page comprises a  
2     World Wide Web page.

1     55. A method as recited in claim 52, wherein the hypermedia page comprises a  
2     World Wide Web page and the component comprises a speech object.

1     56. A method as recited in claim 52, wherein the component comprises a speech  
2     object.

1     57. A method as recited in claim 56, wherein the speech object comprises a  
2     grammar and a set of prompts associated with the grammar.

1     58. A method of allowing a user of a computer to create content for use in a  
2     voice response system, the method comprising:  
3             receiving first user input graphically specifying a spoken dialog between a

4 person and a machine, the first user input including inputs directed to a set of  
5 user-selectable components defining spoken dialog interactions;  
6 storing first data representing a dialog flow for the spoken dialog based  
7 on the first user input;  
8 receiving second user input graphically specifying a correspondence  
9 between a field of a hypermedia page and a property of one of said components;  
10 and  
11 storing second data representing the correspondence based on the second  
12 user input, wherein the first data and the second data are for use by the voice  
13 response system to execute the spoken dialog.

1 59. A method as recited in claim 58, further comprising:  
2 receiving third user input selecting a field of the hypermedia page; and  
3 in response to the third user input, automatically identifying a component  
4 of said set of user-selectable components, for inclusion in the spoken dialog.

1 60. A method as recited in claim 58, further comprising:  
2 receiving third user input specifying a portion of the hypermedia page  
3 that is to be text-to-speech converted at run-time; and  
4 in response to the third user input, enabling text-to-speech conversion of  
5 the specified portion of the Web page.

1    61. A method as recited in claim 58, wherein the hypermedia page comprises a  
2    World Wide Web page.

1    62. A method as recited in claim 61, wherein the hypermedia page comprises a  
2    World Wide Web page and the set of components comprises a set of speech  
3    objects.

1    63. A method as recited in claim 58, wherein the set of user-selectable  
2    components comprises a set of speech objects.

1    64. A method as recited in claim 63, wherein each of the set of speech objects  
2    comprises a grammar and a set of prompts associated with the grammar.

1    65. A method of allowing a user of a computer to create content for use in a  
2    voice response system, the method comprising:  
3         enabling the user to create graphically a dialog flow for a spoken dialog  
4         between a person and a machine by allowing the user to graphically specify a set  
5         of visually-represented speech objects to define the dialog; and  
6         enabling the user to establish graphically a functional link between a  
7         hypermedia page and one of the speech objects by allowing the user to  
8         incorporate graphically an object of a predetermined type into the dialog flow,  
9         the object of the predetermined type specifying a correspondence between an

10 element of a hypermedia page and an element of one of the speech objects.

1    66. A method as recited in claim 65, wherein the object of the predetermined  
2    type specifies a correspondence between a field of the hypermedia page and a  
3    property of the speech object.

1    67. A method as recited in claim 66, wherein said enabling the user to establish  
2    the functional link comprises enabling the user to specify graphically the  
3    correspondence using drag-and-drop inputs.

1    68. A method as recited in claim 65, wherein said enabling the user to establish  
2    the functional link comprises enabling the user to specify graphically the  
3    correspondence using drag-and-drop inputs.

1    69. A method as recited in claim 65, wherein said enabling the user to create  
2    graphically a dialog flow comprises:  
3       receiving user input selecting a field of the hypermedia page; and  
4       in response to the third user input, automatically identify an appropriate  
5       one of the speech object, for inclusion in the spoken dialog.

1    70. A method as recited in claim 65, wherein said enabling the user to establish  
2    graphically a functional link between a hypermedia page and one of the speech

3 objects comprises:

4 receiving user input specifying a portion of the hypermedia page that is to

5 be text-to-speech converted as part of a response to a Web query; and

6 in response to the third user input, enabling text-to-speech conversion of

7 the specified portion of the Web page to be performed in response to a Web

8 query.